

The Relationship between Smartphone Addiction and Attention among Medical Students at Atma Jaya Catholic University of Indonesia

Amelia Prasetyadi^{1*}, Lenny Gustaman²

¹School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

²Department of Psychiatry, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

*Corresponding author: Amelia Prasetyadi (ameliaprasetyadi07@gmail.com)

Abstract

Introduction: Smartphone addiction is characterized by a strong attachment to the smartphone that allows the occurrence of social problems and difficulty in performing everyday activities. Cognitive function disruption is one of smartphone addiction's negative effects, and one component of cognitive function is attention. The prevalence of smartphone addiction in adolescents and young adults was higher since they were relatively more familiar to technology and lacked self-control. The purpose of this study is to determine the relationship between smartphone addiction and attention among medical students at Atma Jaya Catholic University of Indonesia.

Methods: An analytical, cross-sectional study was conducted with a total of 82 respondents. The respondents were from the 2016, 2017, and 2018 batch of medical students at Atma Jaya Catholic University of Indonesia and were selected by stratified random sampling. The data were gathered using Smartphone Addiction Scale Short Version (SAS-SV) questionnaire, in order to estimate the prevalence of smartphone addiction and the Stroop Test to measure attention.

Results: The majority of the subject were female (70,7%) and aged around 17-21 years. The respondents who were addicted to smartphones were 48,8%, and most respondents who were addicted were using their smartphone for 5-≤7 hours/day (63,3%) and spent their time more on social media (56,7%). The mean attention score was 63,81. The mean attention score for non-smartphone addicts was higher than the addicted ones, but there is no statistically significant correlation between smartphone addiction and attention ($p= 0,06$).

Conclusions: There is no significant correlation between smartphone addiction and attention.

Keywords: smartphone - addiction - attention - university students

INTRODUCTION

Communication technology develops in a very rapid manner in this era of globalization. Communication devices, such as smartphones,

are making daily life easier like never before. Today, smartphones are not only for communication purposes but also function as digital cameras, music players, digital positioning systems, and many more.

Smartphones are now becoming an inseparable part of daily human life. In Indonesia, more than 100 million people were using smartphones in 2018.^{1,2} However, the high intensity of using smartphones is becoming an addiction and social issue in the middle of society lately.³

Smartphone addiction is defined as the attachment to smartphone devices that allows social problems to happen, such as self-withdrawal or poor performance in completing daily tasks.⁴ Smartphone addiction is shown by consciously or unconsciously using those devices without paying further attention to time or place.⁵ Robert et al. found that 48% of students are at risk for experiencing smartphone addiction.⁶ For smartphone-addict students, various mental disorders such as sleep disorders, stress, impaired cognitive function, and physical problems, including impaired posture or vision, are emerging as important issues.^{7,8,9,10} Attention is a part of cognitive function that holds a vital role in daily tasks. Smartphone addiction causes dopamine pathways dysfunction that holds an essential role in attention tasks.¹¹

Many students use their smartphones at inappropriate times, such as during classes, which may disturb their ability to concentrate or distract them. If this action last for a long time and becomes habit, it may give a negative impact on students' ability to focus and pay attention. Attention allows individuals to retain important information and process it further.

The human brain has the limitation to process certain information in a particular time frame, so it can only be well-focused on one thing at a time.¹² Based on the description above, and only a few studies conducted with this topic in Indonesia, we would like to do a research about the relationship of smartphone addiction and attention in university students.

METHODS

Study Design

An analytical, cross-sectional study was conducted with a total of 82 participants and was conducted from February to June 2019. This study was reviewed and approved by the Ethics Committee of Atma Jaya Catholic University of Indonesia.

Subjects

The participants were medical students from the class year of 2016, 2017, and 2018 at Atma Jaya Catholic University of Indonesia and were selected by stratified random sampling. The participants of this study were students at the Faculty of Medicine of Atma Jaya class of 2016, 2017, and 2018, aged around 15-24 years old, used a smartphone, willing to participate and fill out the informed consent, in a good condition and had enough sleep for attention test. Students who did not use a smartphone, aged ≥ 25 years, and unwilling to participate were excluded. Written informed consent was collected from all participants before

completing the questionnaire. The students were informed that participation in this study was not mandatory and that all data collected were anonymous.

Data Collection

For the sociodemographic data, we asked the participant to report five items of information: age, gender, class, duration of smartphone use every day, and the most frequent smartphone use purpose. Smartphone addiction data were collected by distributing Smartphone Addiction Scale Short Version (SAS-SV) questionnaire developed by Kwon et al⁴. This scale contains ten questions. Students were asked to rate their agreement on a likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A student was considered to have a smartphone addiction if the total points were ≥ 31 for males and ≥ 33 for females. Cronbach’s alpha for this scale is 0.911. In this study, we use Stroop Test to measure attention. Participants are required to name the ink color instead of reading the word. The test will be held for one minute for each participant.

Statistical Analysis

Statistical analysis performed in this research includes validity and reliability testing, and hypothesis testing by chi-square test. A p-value < 0.05 was considered as statistically significant.

RESULTS

Descriptive analysis was used to examine the demographic. Among 82 study participants, 58 (70.7%) were female, and 24 (29.3%) were male. The mean age of the participants was 19.7 years (standard deviation (SD)=1.04) (Table 1).

Table 1. Sociodemographic data

Sociodemographic Data	Mean ± SD or n (%)
Age	19,7 ± 1,0
Gender	
Male	24 (29,3)
Female	58 (70,7)
Duration of smartphone use per day	
1-<3 hours / day	3 (3,7)
3- <5 hours/day	39 (47,6)
5-<7 hours/day	36 (43,9)
≥ 7 hours/day	4 (4,9)
The most frequent smartphone use purpose	
Call and text	3 (3,7)
Online communication (Whatsapp, Line)	36 (43,9)
Web browsing	8 (9,8)
Social media	30 (36,6)
Playing games (online and offline)	5 (6,1)

Most participants use smartphones for 5-<7 hours/ days (47.6%) for online communication purposes such as Line and Whatsapp. Among 82 students, 40 (48.8%) were addicted to smartphones (Table 2).

Table 2. Prevalence of Smartphone Addiction

Smartphone addiction	n (%)
Not addicted	42 (51.2)
Addicted	40 (48.8%)
Total	82 (100%)

Bivariate analysis by chi-square tests was used to identify the relationship between gender and smartphone addiction, duration of smartphone usage and smartphone addiction, and reason to use gadgets and smartphone addiction. As shown in Table 3, there is no statistically significant correlation between gender and smartphone addiction ($P=0,334$), and reason to

use gadgets and smartphone addiction ($P=0.240$), but we found a statistically meaningful correlation between duration of smartphone usage and smartphone addiction. ($P=0.04$)

Bivariate analysis by independent t-test was used to identify the association between smartphone addiction and attention. Based on the normality test using Kolmogorov-Smirnov, Smartphone Addiction Scale Short Version score and Stroop test score show normal distribution. The P value is 0.06, which means no statistically significant correlation between smartphone addiction and attention (Table 4).

Table 3. Correlation between gender, duration of smartphone use every day, and the most frequent smartphone use purpose and smartphone addiction.

Variable	Smartphone Addiction		p
	Addicted n (%)	Not Addicted n (%)	
Gender			
Male	14 (58,3)	10 (41,7)	0,334
Female	26 (44,8)	32 (55,2)	
Duration of smartphone use per day			
1-≤3 hours/ day	2 (66,7)	1 (33,3)	0,047
3-≤5 hours/day	13(33,3)	26 (66,7)	
5-≤7 hours/day	23 (63,9)	13 (36,1)	
≥7 hours/day	2 (50)	2 (50)	
The most frequent smartphone use purpose			
Call or text	2 (66,7)	1 (33,3)	0,240
Online communication (Line, Whatsapp)	15 (41,7)	21 (58,3)	
Web browsing	2 (25)	6 (75)	

Variable	Smartphone Addiction		P
	Addicted n (%)	Not Addicted n (%)	
Social media	17 (56,7)	13 (43,3)	
Playing games (offline and online)	4 (80)	1 (20)	

Table 4. Correlation between smartphone addiction and attention

	Addicted	Not addicted	P
Stroop test score	61.48 ± 10.51	65.75 ± 11.30	0.06

DISCUSSION

The prevalence of smartphone addiction in this study was 48.8%. This study showed no significant correlation between gender and smartphone addiction. This result was consistent with the study of Cubon and Gundogmus¹³ in Turkey, which also showed no significant correlation that might be caused by the differences in smartphone usage among men and women.⁷ In certain conditions, cultural factors also play a huge role in how people use their smartphones. Most respondents who experience smartphone addiction would use their smartphones for about 5-≤7 hours per day, and the statistical test showed a significant result. This result was consistent with the study conducted by Cha and Seo¹⁴ in South Korea, which showed smartphone-addicted respondents would use their smartphones for about 5.2 hours compared with 4.6 hours for the non-addicted ones.

The most frequent activity for smartphone-addicted respondents was surfing social media.

Kibona and Miyaga¹⁵ showed that 48% of students use their smartphone for social media for about 5-7 hours per day. Statistically, this study showed no significant correlation due to the differences in smartphone usage among men and women.

The P value is 0.06, which means no statistically significant correlation between smartphone addiction and attention. This study was the same as previous studies that found no correlation between smartphone addiction and attention. Wilmer et al.⁹ research found limited empirical evidence for the affirmation of the effect of smartphones on our attentional ability. Acute impact of smart devices to the ongoing cognitive task was proved with clear evidence, while the long-term impacts was not clearly documented. The important factor that differs from the study that showed a correlation between smartphone addiction and attention was the method to assess attention.¹⁷

CONCLUSIONS

Smartphone addiction was usual among medical students investigated. The result shows no association between smartphone addiction and attention, gender and smartphone addiction, duration of smartphone usage with smartphone addiction, and frequent use smartphone and smartphone addiction, but there was a correlation between smartphone addiction and duration. The results of this study suggest that intervention was needed in effort to decrease smartphone addiction problems among medical students. In addition, if the presence of a smartphone is sufficient to cause diminished attention and performance downgrade, then further research should consider whether another mobile technology has the potential to do the same.

ACKNOWLEDGMENT

The author would like to thank all the participants in this study.

CONFLICT OF INTEREST

No conflict of interest.

REFERENCES

1. Kegunaan/Fungsi/Manfaat Handphone Smartphone Bagi Manusia Organisasi.org. [terhubung berkala] <http://www.organisasi.org/1970/01/kegunaan-fungsi-manfaat-handphone->

[smartphone-bagi-manusia.html](#) [22 September 2018]

- Indonesia Raksasa Teknologi Digital Asia. Website Resmi Kementerian Komunikasi dan Informatika RI. 2015. [terhubung berkala] https://www.kominfo.go.id/content/detail/6095/indonesia-raksasa-teknologi-digital-asia/0/sorotan_media [15 September 2018]
- Liu CH, Lin SH, Pan YC, Lin YH. Smartphone gaming and frequent use pattern associated with smartphone addiction. *Med.* 2016;95(28):1-4
- Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: Development and validation of a short version for adolescents. *PLoS One.* 2013;8(12):1-7.
- Körmendi A, Czki ZB, Végh BP, Székely R. Smartphone use can be addictive? A case report. *J Behav Addict.* 2016;5(3):548-52.
- Roberts J, Yaya L, Manolis C. The invisible addiction: Cell-phone activities and addiction among male and female college students. *J Behav Addict.* 2014;3(4):254-265.
- Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Comput Human Behav.* 2016;57:321-5.
- Wilmer HH, Sherman LE, Chein JM. Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Front Psychol.* 2017;8:1-16

9. Hansraj KK. Assessment of stkoresses in the cervical spine caused by posture and position of the head. *Surg Technol Int.* 2014;25:277–9.
10. Kim J, Hwang Y, Kang S, Kim M, Kim TS, Kim J, et al. Association between Exposure to Smartphones and Ocular Health in Adolescents. *Ophthalmic Epidemiol.* 2016;23(4):269–76.
11. Dang LC, O’Neil JP, Jagust WJ. Dopamine supports coupling of attention-related networks. *J Neurosci.* 2012;32(28):9582
12. Mendoza JS, Pody BC, Lee S, Kim M, McDonough IM. The effect of cellphones on attention and learning: The influences of time, distraction, and nomophobia. *Comput Human Behav.* 2018;86:52–60.
13. Coban DA, Gundogmus I. Effect of smartphone usage profiles on addiction in a university student: a cross-sectional study. Dusunen Adam *The Journal of Psychiatry and Neurological Sciences.* 2019;32(2):87.
14. Cha SS, Seo BK. Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Heal Psychol Open.* 2018;5(1).
15. Kibona L, Mgya G. Smartphones’ effects on academic performance of higher learning students. *Journal of Multidisciplinary Engineering Science and Technology.* 2015;2(4):777-84.
16. Amidtaher M, Saadatmand S, Moghadam Z, Fathi G, Afshar R. The Relationship between Mobile Cellphone Dependency , Mental Health and Academic Achievement. *Am J Ed Research.* 2016;4(5):408–11.
17. Thornton B, Faires A, Robbins M, Rollins E. The mere presence of a cell phone may be distracting implications for attention and task performance. *Soc Psychol.* 2014;45(6):479–88.